#### TABLE BEFORE UPSERT OPERATION

A (primary key)	В	<u> </u>
1	1	

110	INPUT ROWS	CATEGORIZATION OF INPUT ROWS
-----	------------	------------------------------

_1	
A (primary key)	В
1	2
2	2
3	3
2 .	4
1	3

Optimized UPSERT Operation	Non-Optimized UPSERT Operation	<b>⊢</b> 120	
Update	Update		
Insert (duplicate)	Insert		
Insert	Insert		
Insert (duplicate)	Update		
Update	Update		

## 130 TABLE AFTER OPTIMIZED UPSERT OPERATION

1 OF OLIVE OF LIVERION		
A (primary key)	В	
1	3	
2	4	
3	3	

TABLE AFTER NON-OPTIMIZED UPSERT OPERATION

140			
A (primary key)	В	<del>- 140</del>	
1	3		
2	4		
3	3		

FIG. 1 PRIOR ART



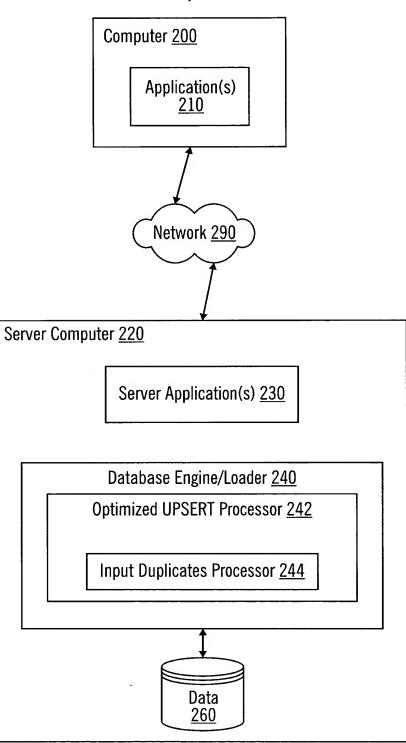
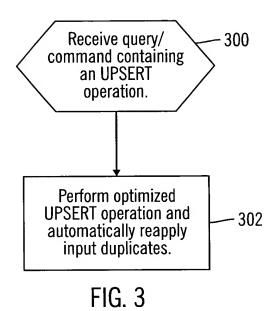


FIG. 2



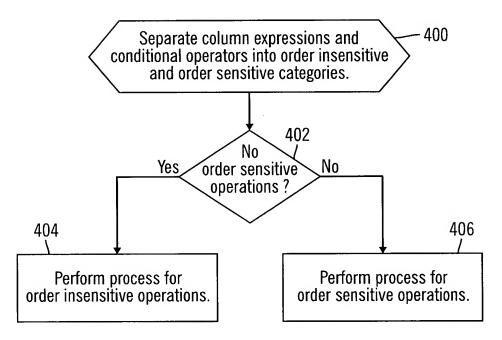
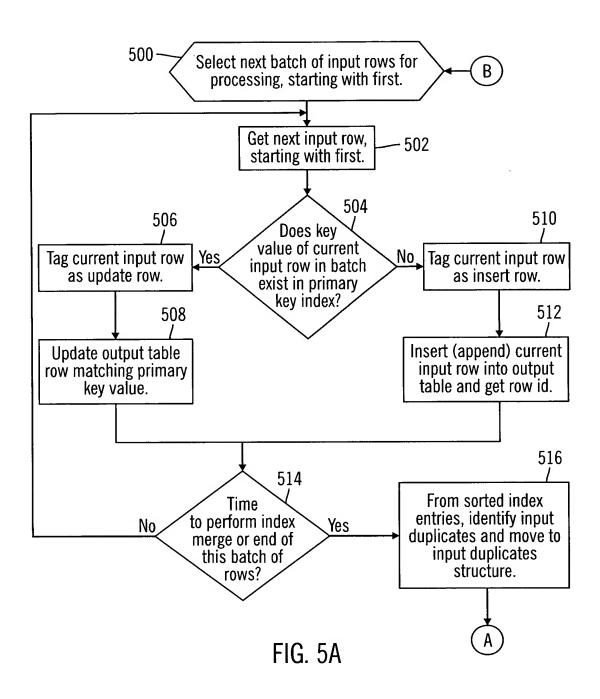


FIG. 4



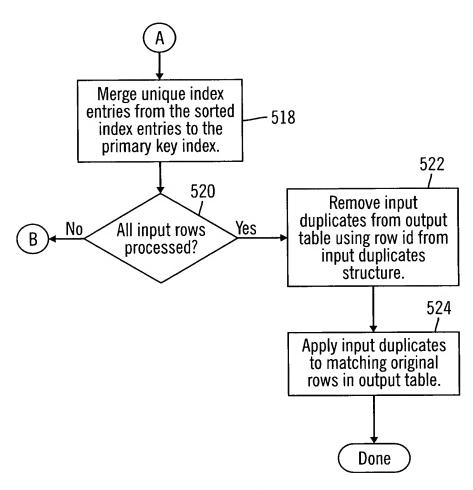


FIG. 5B

#### TABLE BEFORE UPSERT OPERATION

Row Id A (primary key)		В	С	<del></del> 600
1	1	1	1	

010	RETAIN B and ADD INPUT I	ow value of c to existing c column value
610	INPUT ROWS	CATEGORIZATION OF INPUT ROWS
		Ontimized Non-Ontimized

В	С
2	2
2	2
3	3
4	4
   PPENS AT T 	HIS POINT
5	5
	2 2 3 4 PPENS AT T

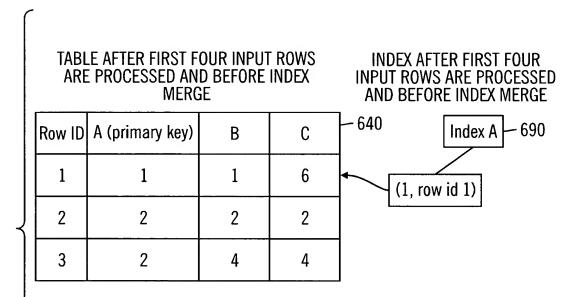
Optimized UPSERT Operation	Non-Optimized UPSERT Operation	-
Update	Update	
Insert (duplicate)	Insert	
Update	Update	
Insert (duplicate)	Update	
Update	Update	

620

# TABLE AFTER OPTIMIZED UPSERT OPERATION AND REAPPLICATION OF DUPLICATES

A (primary key)	В	С	├-630
1	1	6	
2	2	11	

FIG. 6A



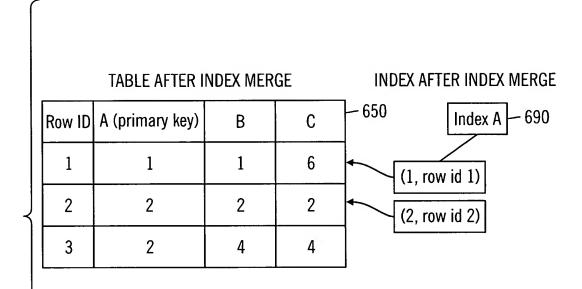
Sorted index entries:

(sequence number, key, row id)

(2, 2, row id 2)

(4, 2, row id 3)

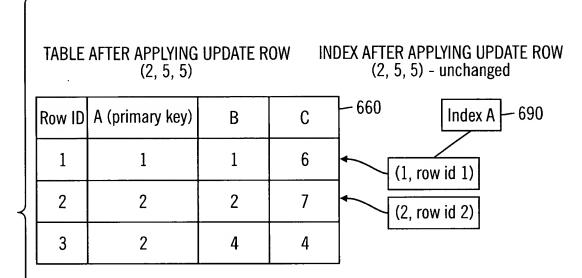
FIG. 6B



Sorted index entries: EMPTY

Input duplicate entries: (2, row id 3)

FIG. 6C



Sorted index entries: EMPTY

Input duplicate entries: (2, row id 3)

FIG. 6D

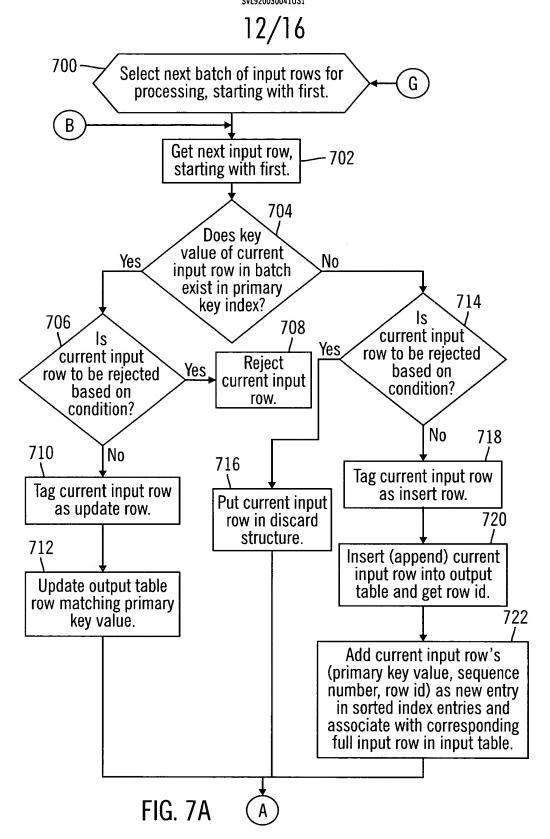
#### TABLE AFTER APPLYING DUPLICATES INDEX AFTER APPLYING DUPLICATES

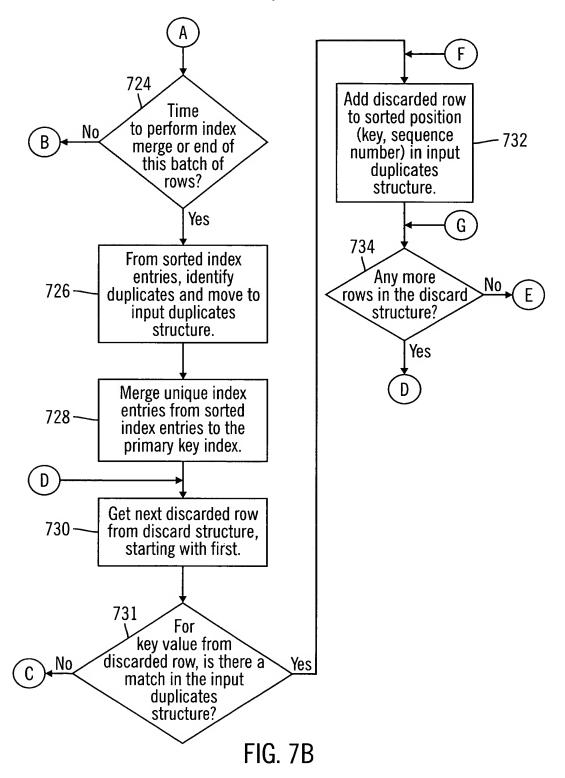
Row ID	A (primary key)	В	С	- 670 Index A - 690
1	1	1	6	(1, row id 1)
2	2	2	11	(2, row id 2)

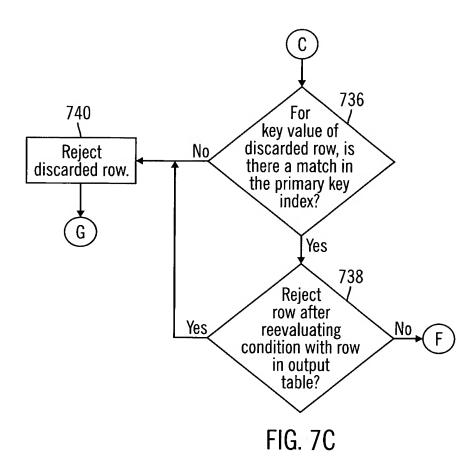
Sorted index entries: EMPTY

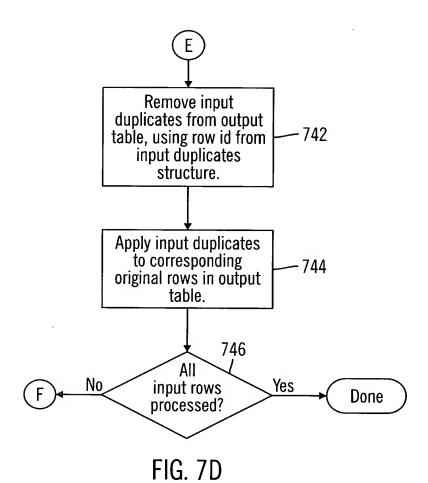
Input duplicate entries: EMPTY

FIG. 6E









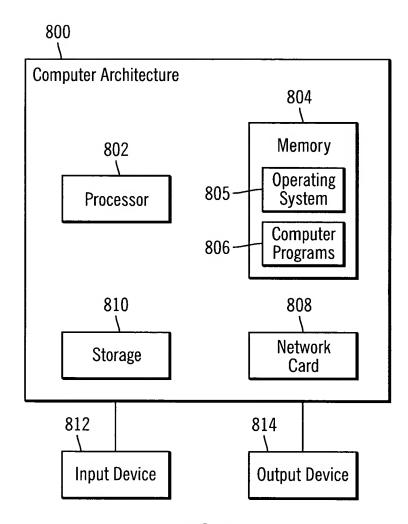


FIG. 8